WHAT IS CLAIMED IS:

1. A connection structure, comprising:

an optical element including an optical surface;

an optical fiber; and

a connecting part that joins an end surface of the optical fiber and the optical surface.

2. The connection structure according to Claim 1, at least a part of the end surface of the optical fiber facing the optical surface.

3. A connection structure, comprising:

an optical element including an optical surface;

an optical fiber including a core and a clad; and

a connecting part that joins an end surface of the core and the optical surface.

4. The connection structure according to Claim 3, at least a part of the end surface of the core facing the optical surface.

5. The connection structure according to Claim 3, a refractive index of the connecting part being almost equal to a refractive index of the core of the optical fiber.

6. The connection structure according to Claim 3, the refractive index of the connecting part being greater than a refractive index of the clad of the optical fiber.

7. The connection structure according to Claim 3, a height of the end surface of the core being different from a height of an end surface of the clad at an end part of the optical fiber that is joined to the connecting part.

8. The connection structure according to Claim 7, the end surface of the core protruding from the end surface of the clad, and the core and the clad forming a portion defining a convex at the end part.

9. The connection structure according to Claim 6, an area that surrounds the connecting part being covered by a sealant at the end part.

10. The connection according to Claim 9, a refractive index of the sealant being smaller than the refractive index of the core of the optical fiber and the refractive index of the connecting part.

11. The connection structure according to Claim 10, the refractive index of the connecting part being almost equal to the refractive index of the core of the optical fiber, and the refractive index of the sealant being almost equal to the refractive index of the clad of the optical fiber.

12. The connection structure according to Claim 7, the end surface of the clad protruding from the end surface of the core, and the core and the clad forming a portion defining a concave at the end part.

13. The connection structure according to Claim 3, the connecting part being formed by hardening a liquid material that is hardened by charging energy.

14. The connection structure according to Claim 13, the connecting part being composed of ultraviolet curing resin.

15. The connection structure according to Claim 3, the optical element being at least one of a surface emitting semiconductor laser, a semiconductor light emitting diode, an electroluminescent device, and a photo diode.

16. An optical module, comprising:

the connection structure according to Claim 3, and

a semiconductor chip electrically coupled to the optical element.

17. An optical transmission unit, comprising:

an optical fiber;

a light emitting element including an emitting plane, and enabling a light that is emitted from the emitting plane into an end surface of the optical fiber;

a semiconductor chip electrically coupled to the light emitting element;

a light receiving element including a plane of incidence, and introducing a light that is emitted from the other end surface of the optical fiber through the plane of incidence; and

a semiconductor chip electrically coupled to the light receiving element;

the connection structure according to claim 3, the connection structure including at least one of a connection structure between the light emitting element and the optical fiber, and a connection structure between the light receiving element and the optical fiber.

18. A connection method of coupling an optical element and an optical fiber, comprising:

(a) forming a connecting part precursor by applying a liquid agent to at least one of an end surface of the optical fiber and an optical surface of the optical element; and

(b) forming a connecting part by hardening the connecting part precursor while joining the end surface of the optical fiber and the optical surface via the connecting part precursor.

19. The connection method of coupling an optical element and an optical fiber according to Claim 18, step (b) further comprising:

joining the end surface of the optical fiber and the optical surface via the connecting part precursor while making at least a part of the end surface of the optical fiber face the optical surface.

20. A connection method of coupling an optical element and an optical fiber, comprising:

(a) forming a connecting part precursor by applying a liquid agent to at least one of an end surface of the core of the optical fiber and an optical surface of the optical element; and

(b) forming a connecting part by hardening the connecting part precursor while joining the end surface of the core and the optical surface via the connecting part precursor.

21. The connection method of coupling an optical element and an optical fiber according to Claim 20, step (b) further comprising:

joining the end surface of the core and the optical surface via the connecting part precursor while making at least a part of the end surface of the core face the optical surface.

22. The connection method of coupling an optical element and an optical fiber according to Claim 20, the height of the end surface of the core being different from the height of the end surface of the clad.

23. The connection method of coupling an optical element and an optical fiber according to Claim 18, the liquid agent being applied by an ink-jet method.

24. The connection method of coupling an optical element and an optical fiber according to Claim 18, the connecting part precursor being hardened by charging energy.